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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,685	11/13/2003	Evgeniya Freydina	10168-7080.19	9109

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EXAMINER	
DRODGE, JOSEPH W	

ART UNIT	PAPER NUMBER
1723	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/712,685	FREYDINA ET AL.	
	Examiner	Art Unit	
	Joseph W. Drodge	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-20,22 and 27-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20,22 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *0307*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hark patent 4,808,287 in view of Batchelder et al patent 6,126,805. Hark

discloses a system for producing treated water comprising introduction of a municipal water supply stream into a point of entry that may be considered to be the inlet to prefilter 1, intermediate treatment means of carbon filters and reverse osmosis units, and removal of undesirable species in electrodialysis (EDI) unit 9. It is stated that the voltage is controlled by a controller and electric current periodically reversed for the purpose of cleaning off contaminants that deposit on the electrodes (column 4, lines 38-50). Treated water is then distributed to points of use through pumps 23 and 25. Hark additionally discloses storing the water in reservoirs 22 and/or 24, thus having a "reservoir system"

The claims all differ in requiring that the electrical current is maintained below a limiting current density to suppress hydroxyl ion generation. Batchelder teaches that EDI-containing water treatment systems are operated near or below the limiting current density, sometimes in combination with reversal of direction of the electric current (as in Batchelder) in order to mitigate the precipitation and deposition of minerals to contact surfaces (column 1, line 62-column 2, line 19 and column 4, line 42-column 5, line 2, etc.) Such actions are taught as reducing "water splitting" or formation of hydroxyl ions. It is noted that the water treated by Hark contains minerals among other contaminants (Hark at column 2, lines 33-45). More specifically, in column 8, lines 34-47 and column 12, lines 35-38 and 45-51, Batchelder explicitly teaches operating the anion exchange membranes of an electrodialysis or electrodeionizing device to have a reduced water-splitting capacity and to operate the cation exchange membranes of such device to have a relatively limited water-splitting capacity compared to enhanced water splitting

membranes, with such objectives realized by limiting current densities [as required by claim 3].

Thus, it would have been obvious for one of ordinary skill in the art to have controlled the EDI process in the Hark system by operating near or below the limiting current density to minimize water splitting, or formation of hydroxyl ions, as taught by Batchelder, to further limit the amount of precipitation occurring on the EDI surfaces and downstream of the device especially in the concentrating stream, so as to optimize the EDI operation in removal of salts and other contaminants.

For claims 2,8,9,12 the treated water is stored in reservoirs 22 and 24 under some degree of pressure may be pressurized , by way of pressure imparted by upstream pumps 7 and 19-21 and the reservoirs or tanks being maintained full of water (Hark at column 5, lines 44-46).

With respect to claim 11 and claims dependent therefrom including claims 12 and 13, Rela discloses the overall process as reducing level of all impurities by a factor of approximately 700 upstream of the electrochemical device, resulting in water having very high resistance or very low conductivity (column 11, lines 54-65 and column 12, lines 8-12, respectively). Rela stores water in reservoirs 22 and 24 for claim 12 and measures impurity removal of the system (column 1, lines 55-65, etc.) to be able to calculate percentage of the impurities removed for claim 13.

For claim 27, treated and recycled water is mixed with water from the point of entry (upstream of pre-filtration unit 1) between activated carbon filter 2 and carbon filter 3.

Claims 4-7,11-20,22 and 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hark in view of Batchelder and additionally in view of Tamura et al patent 6,303,037 and Rela patent 6,607,668.

Claims 4-7,13-16,19,20,31 and 32 all further differ from Hark in requiring that water be introduced into a reservoir that is upstream of it's introduction into the electrochemical device, or alternately or additionally, in requiring that a plural zone reservoir system, with one zone or reservoir upstream of the electrochemical device, in addition to the reservoir which is downstream of the electrochemical device. Hark, in review, discloses a system comprising an initial activated carbon filter followed by a pair of reverse osmosis membranes and an EDI unit. Tamura teaches to store water in a tank/reservoir following the activated carbon filter, prior to introducing to a feed pump for the reverse osmosis membranes (column 4, line 54-column 5, line 4 and column 5, lines 33-52). Tamura mentions in the prior art that his system is an improvement for systems employing reverse osmosis and EDI treatment. Also, Rela teaches water flowing through a softener tank, inherently providing a discrete residence time for water ahead of flowing it to reverse osmosis and EDI units (figures and column 6, line 65-column 7, line 7). It would have been further obvious to have utilized a storage tank/reservoir upstream of the reverse osmosis units/electrochemical device in the Hark system, as taught by Tamura and Rela, in order to maintain adequate and stable feed pressure to the inlet side of the reverse osmosis membranes.

Claims 4-7,13-16,19,20,31 and 32 further differ in requiring measuring of at least one water property and controlling at least the EDI device based on such property.

However, Rela teaches a water treatment system that includes prefilter, reverse osmosis and use of an EDI unit such as in Hark and in which various water properties are sensed/measured and sensed values are used by the controller to control flow rates of raw water, flow rates of the water being distributed to end use points, amount of current applied to the electrodeionization device and other system parameters (col. 4, l 43-67, col. 10. l 28-40). It would have been also obvious to one of ordinary skill in the art to have incorporated the monitoring and control taught by Rela, into the Hark system, so as to optimize overall performance of the water treatment system.

For claims 17,18, 20 and 22, and claims dependent therefrom, Hark discloses a system for producing treated water comprising introduction of a municipal water supply stream into a point of entry that may be considered to be the inlet to prefilter 1, intermediate treatment means of carbon filters and reverse osmosis units, and removal of undesirable species in electrodialysis (EDI) unit 9. It is stated that the voltage is controlled by a controller and electric current periodically reversed for the purpose of cleaning off contaminants that deposit on the electrodes (column 4, lines 38-50). Treated water is then distributed to points of use through pumps 23 and 25. The treated water that is stored in reservoirs 22 and 24 is under some degree of pressure having been pressurized , by way of pressure imparted by upstream pumps 7 and 19-21 and the reservoirs or tanks being maintained full of water (Hark at column 5, lines 44-46).

The claims all differ in requiring that the electrical current is maintained below a limiting current density to suppress hydroxyl ion generation. Batchelder teaches that EDI-containing water treatment systems are operated near or below the limiting current density, sometimes in combination with reversal of direction of the electric current (as in Batchelder) in order to mitigate the precipitation and deposition of minerals to contact surfaces (column 1, line 62-column 2, line 19 and column 4, line 42-column 5, line 2, etc.) Such actions are taught as reducing "water splitting" or formation of hydroxyl ions. It is noted that the water treated by Hark contains minerals among other contaminants (Hark at column 2, lines 33-45).

Thus, it would have been obvious for one of ordinary skill in the art to have controlled the EDI process in the Hark system by operating near or below the limiting current density to minimize water splitting, or formation of hydroxyl ions, as taught by Batchelder, to further limit the amount of precipitation occurring on the EDI surfaces, so as to optimize the EDI operation in removal of salts and other contaminants.

These claims also require the reservoir system being "fluidly connected" to the point of entry. The reservoir system of Hark is directly fluidly connected to the immediately upstream electrodialysis unit and indirectly fluidly connected to points further upstream including the potable water inlet point of entry to the entire system.

For claims 17,21 and 22, the treated water stored in reservoirs 22 and 24 of Hark is under some degree of pressure and may be pressurized , by way of pressure imparted by upstream pumps 7 and 19-21 and the reservoirs or tanks being maintained full of water (Hark at column 5, lines 44-46). Alternatively, the entire system that

contains reservoirs 22 and 24 can be understood as being pressurized by pump 7 and other pumps. Also note that water discharged from Hark's electrodialysis unit must undergo "depressurization" prior to being drained, thus water proceeding through conduits 17 and 16 has not been depressurized.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hark in view of Batchelder and further in view of Rela.

These claims further differ in requiring measuring of at least one water property and controlling at least the EDI device based on such property. However, Rela teaches a water treatment system that includes prefilter, reverse osmosis and use of an EDI unit such as in Hark and in which various water properties are sensed/measured and sensed values are used by the controller to control flow rates of raw water, flow rates of the water being distributed to end use points, amount of current applied to the electrodeionization device and other system parameters (col. 4, l 43-67, col. 10. l 28-40). It would have been also obvious to one of ordinary skill in the art to have incorporated the monitoring and control taught by Rela, into the Hark system, so as to optimize overall performance of the water treatment system.

Applicant's arguments filed on March 28, 2007 have been fully considered but they are not persuasive. It is argued that since Batchelder teaches in text of column 4, line 42-column 5, line 2 to maintain a limiting current density at the highest possible current densities, with hydrolysis being mitigated by pre-treatment such as use of ion exchange membranes. However, it is submitted that such text is interpreted to mean

that current densities are also selected to remain below a maximum level that would generate hydroxyl ions, split water into hydrogen or hydroxide ions.

It is also argued that Batchelder undertakes various other measures, besides limiting current densities to avoid generating hydroxyl ions including chemical or ion exchange softening, periodic reversal of current, and selection of particular materials for the membranes used in the EDI device. It is submitted that Batchelder, taken as a whole, is interpreted to teach that a variety of measures are taken which cumulatively ensure a minimum of generating of hydroxyl ions including limiting of the current densities,

It is argued that none of the formerly applied prior art discloses a pressurized reservoir system that is connected upstream of the electrochemical device. It is submitted that Tamura in particular infers motivation to provide for such reservoir or tank.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Drodge at telephone number 571-272-1140. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Griffin, can reached at 571-272-1189. The fax phone number for the examining group where this application is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either private PAIR or Public PAIR, and through Private PAIR only for unpublished applications. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JWD

May 9, 2007

JOSEPH DRODGE
PRIMARY EXAMINER